



Docket 82817SMR  
Customer No. 01333

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**  
**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re Application of

Jin-Shan Wang, et al

INK JET INK COMPOSITION

Serial No. 09/918,584

Filed July 31, 2001

Group Art Unit: 1714

Examiner: Callie Shosho

I hereby certify that this correspondence is being deposited today with the United States Postal Service as first class mail in an envelope addressed to Commissioner For Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

*Karen J. Wacenske*  
Karen J. Wacenske

1-25-06  
Date

Mail Stop APPEAL BRIEF-PATENTS

Commissioner for Patents

P.O. Box 1450

Alexandria, VA. 22313-1450

Sir:

**APPEAL BRIEF TRANSMITTAL**

Enclosed herewith is Appellants' Appeal Brief for the above-identified application.

The Commissioner is hereby authorized to charge the Appeal Brief filing fee to Eastman Kodak Company Deposit Account 05-0225. A duplicate copy of this letter is enclosed.

Respectfully submitted,

*Kathleen Neuner Manne*

Attorney for Appellants  
Registration No. 40.101

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Enclosures

If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.



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Alexandria, VA. 22313-1450

Sir:

**APPEAL BRIEF PURSUANT TO 37 C.F.R. 41.37 and 35 U.S.C. 134**

This is an appeal pursuant to 35 U.S.C. §134 from the Examiner's decision rejecting all pending claims 1 and 10-18 as set forth in the Final Office Action mailed August 24, 2005.

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## **APPELLANT'S BRIEF ON APPEAL**

Appellants hereby appeal to the Board of Patent Appeals and Interferences from the Examiner's Final Rejection of claims 1 and 10-18 which was contained in the Office Action mailed August 24, 2005.

A timely Notice of Appeal was filed 26 October 2005.

### **Real Party In Interest**

As indicated above in the caption of the Brief, Eastman Kodak Company is the real party in interest.

### **Related Appeals And Interferences**

A Pre-Appeal Brief Request for Review was filed on October 26, 2005 subsequent to the Final Rejection. The Panel has rejected claims 1 and 10-18 in the Office communication mailed November 25, 2005.

### **Status Of The Claims**

Claims 1 and 10-18 are pending in the application.

Claims 2-9 stand cancelled.

Claims 1 and 10-18 stand finally rejected and are the subject of this appeal.

Appendix I provides a clean, double spaced copy of the claims on appeal.

### **Status Of Amendments**

There have been no amendments to the application subsequent to the Final Office Action mailed August 24, 2005.

### **Summary of Claimed Subject Matter**

The invention relates to an ink jet ink composition containing a water-soluble hyperbranched polymeric dye (page 4, lines 14-19; and examples) with a chromophore and a hydrophilic group incorporated into the polymer base chain (page 4, lines 5-7; page 6, lines 17-21; structures on pages 8-9; and examples). The ink jet ink composition, when printed, provides an image which has improved waterfastness, lightfastness, and stability towards pollutants such as ozone and has

improved firability through an ink jet printhead (page 3, line 30 through page 4, line 2; and examples).

Independent claim 1 recites an ink jet ink composition containing water, a humectant (page 9, lines 7-21; and page 10, lines 22-25), and a water-soluble hyperbranched polymeric dye (page 4, lines 14-19; and examples) having a dye chromophore and a hydrophilic group incorporated into the polymer base chain (page 4, lines 5-7; page 6, lines 17-21; structures on pages 8-9; and examples).

### **Grounds of Rejection to be Reviewed on Appeal**

The following issues are presented for review by the Board of Patent Appeals and Interferences:

1. Whether claims 11-13 are in proper dependant form under 37 CFR 1.75(c) (properly under 35 U.S.C. §112, second paragraph).
2. Whether claims 1 and 10-18 comply with the written description requirement of 35 U.S.C. §112, first paragraph.

### **Arguments**

#### **Objection to claims 11-13 under 37 CFR 1.75(c).**

In paragraph 2 of the Final Action mailed August 24, 2005, claims 11-13 were objected to under 37 CFR 1.75(c) for failing to further limit the subject matter of a previous claim. This issue is properly appealed because it raises issues of the scope and clarity of claims 11-13. The objection should have been made as a rejection under 35 U.S.C. §112, second paragraph, and is subject to appeal before the Board of Patent Appeals and Interferences.

The Examiner refers to the Office Action dated April 8, 2005 and states the objection as follow:

Claim 11, which depends on claim 1, recites that the hyperbranched polymer having a dye chromophore and a hydrophilic group incorporated into the polymer base chain is prepared by polymerization of monomer of the formula  $M^1-R^7-M_m^2$  wherein  $R^7$  is a linear branched alkyl, carbonyl, or aromatic moiety containing a dye chromophore and a hydrophilic group incorporated into the polymer base chain. Thus, claim 11 fails to further limit the scope of the claim on which it depends given that while claim 1 is limited to water-soluble polymers possessing

hydrophilic group incorporated into the polymer base chain, the hyperbranched polymer of claim 11 encompasses hyperbranched polymeric dye that are not water-soluble and do not contain hydrophilic group incorporated into the polymer base chain, i.e. when  $R^7$  is linear or branched alkyl. Thus claim 11 is broader than the claim on which it depends, namely claim 1, given that while claim 1 is limited to water-soluble hyperbranched polymeric dye with dye chromophore and hydrophilic group incorporated into the polymer base chain, claim 11 encompasses both hyperbranched polymeric dye that is water-soluble and contains hydrophilic group incorporated into the polymer base chain, i.e. when  $R^7$  is carbonyl or aromatic moiety containing a dye chromophore, and hyperbranched polymeric dye that is not water-soluble and does not contain hydrophilic group incorporated into the polymer base chain, i.e.  $R^7$  is linear or branched alkyl.

Similar objections arise with respect to present claims 12-13 which each also depends on claim 1 and which each encompass both water-soluble hyperbranched polymeric dye and hyperbranched polymeric dye that is not water-soluble. Thus, each of claim 12 and 13 fail to further limit the scope of the claim on which they depend given that each claim is broader than claim 1.

Respectfully, this rejection is in error, and reversal is requested for at least the following reasons.

"Claims in dependent form shall be construed to include all the limitations of the claim incorporated by reference into the dependent claim." 37 CFR 1.75(c). Claims 11-13 clearly state "The composition of Claim 1 wherein said hyperbranched polymer having a dye chromophore and a hydrophilic group incorporated into the polymer base chain is prepared by ..." Thus, each objected to claim clearly requires the same as claim 1, that the hyperbranched polymer have a hydrophilic group incorporated into the polymer base chain.

In each of claims 11-13, the hyperbranched polymer is prepared by chain polymerization, condensation polymerization, or addition polymerization of one or more monomers of a given formula. The Examiner has repeatedly focused on the fact the specification provides definitions for the monomers wherein all components of the monomer may not include a hydrophilic group. Though the specification may be examined for clarification of the claims, the specification cannot be read into the claims. The claims clearly require that the resultant product, the claimed hyperbranched polymer, have a hydrophilic group

incorporated into the polymer base chain. Any portion of the monomer(s) reacting to form the polymer may contain the hydrophilic group. Because the claims require the product to contain a hydrophilic group incorporated into the polymer base chain, one of ordinary skill in the art upon reading the claim would understand that the monomers forming the polymer must contain the hydrophilic group.

Therefore it is respectfully urged that claims 11-13 are properly dependent from claim 1, and such dependency, as stated clearly in each of claims 11-13, should not be read out of the claims. Properly read, the claims incorporate all the features of claim 1, and are not broader than claim 1. It is respectfully requested that the objection be reversed.

**Rejection of claims 1 and 10-18 under 35 U.S.C. §112.**

In paragraph 4 of the Final Office Action mailed August 24, 2005, claims 1 and 10-18 were rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. The Examiner states the rejection as follows:

Claim 1 has been amended to only recite "water-soluble hyperbranched polymeric dye comprising a hyperbranched polymer having a dye chromophore and a hydrophilic group incorporated into the polymer base chain", i.e. specific recitation of hydrophilic groups has been deleted. It is the examiner's position that this change fails to satisfy the written description requirement under the cited statute since there does not appear to be a written description requirement of the phrase in the application as originally filed, *In re Wright*, 866 F.2d 422, 9 USPQ2d 1649 (Fed. Cir. 1989) and MPEP 2163.

As support for the amendment to present claim 1, applicants note that polymers recited on page 4, lines 14-19 and page 7, lines 13-16 are water-soluble polymers. It is agreed that page 4, lines 14-19 provides support for the recitation of water-soluble polyamide. With respect to page 7, lines 13-16, it is noted that these polymers would be water-soluble depending on the dye and/or monomers used to prepare them.

As further support for the above amendment, applicants point to page 6, line 22-page 7, line 12, page 11, line 19-page 12, line 29, and the exemplary polymer structures on pages 8-9 of the present specification.

However, while these structures contain specific types of hydrophilic groups, these portions do not provide support for the broad recitation of "hydrophilic groups" as presently claimed. It is noted that there is no disclosure in the present specification of the phrase "hydrophilic". Thus, support for this phrase must be found in the specific recitations of hydrophilic groups found in the present specification. The present broad recitation of "hydrophilic group" in the present claims encompasses all types of hydrophilic groups for which there is no support in the present specification.

Respectfully, this rejection is in error, and reversal is requested for at least the following reasons.

The terms "water-soluble" and "hydrophilic" are well known in the chemical arts to have established meanings. The use of such terms in the claims are supported by the specification as filed, either explicitly, inherently, or implicitly, and would be understood by one of ordinary skill in the art of chemistry to be necessary requirements for the hyperbranched polymeric dye. As such, the rejection under 35 U.S.C. § 112, first paragraph, of these terms is improper.

The absence of definitions or details for well-established terms or procedures should not be the basis of a rejection under 35 U.S.C. 112, first paragraph, for lack of adequate written description. See MPEP 2163. "The fundamental factual inquiry is whether the specification conveys with reasonable clarity to those skilled in the art that, as of the filing date sought, applicant was in possession of the invention as now claimed." See, e.g., *Vas-Cath, Inc.*, 935 F.2d at 1563-64, 19 USPQ2d at 1117.

The rejected phrase includes two terms, "water-soluble" and "hydrophilic." These terms are linked as used in the claim, because "hydrophilic" describes a portion of the hyperbranched dye that is "water-soluble." As known to one of ordinary skill in basic chemistry, for a substance to be water-soluble, it must have hydrophilic groups accessible for interaction with water or a water-like solvent, such as alcohol. Thus, the term "hydrophilic" recites only what is already apparent to one of ordinary skill in the art. The presence of a group capable of interacting with water must be present in the hyperbranched polymeric dye to make it water-soluble. Because the



hyperbranched polymeric dye is formed by reaction of monomers, the hydrophilic groups must be present during and after formation of the hyperbranched polymeric dye. In order to avoid loss of the hydrophilic groups during polymerization, it would be apparent to one of ordinary skill in the art of chemistry that the hydrophilic groups be incorporated into the base chain of one or more monomer forming the polymer, and therefore would be present in the resultant polymer base chain. Examples of reactive monomers used to form the polymers of the claimed invention are set forth in the specification at page 6, line 22, through page 7, line 12; by the two specific structures on pages 8 and 9; and by the hyperbranched polymeric dyes set forth in the Examples at page 11, line 19, through page 12, line 29. The hydrophilic group can be in any portion of the monomers forming the polymeric base chain, but are not formed by reaction of the monomers.

The presence of hydrophilic groups in the polymeric base chain is indicated within the specification, both expressly through the exemplary structures and exemplified inventive dyes, and implicitly or inherently as necessary for formation of a water-soluble substance, as would be recognized by one of ordinary skill in the art of chemistry. Therefore, the question becomes whether the term "water-soluble" is adequately supported by the specification as filed.

As described in the specification at page 2, lines 12-13, and as known to one of ordinary skill in the art of chemistry, "[a] dye is a colorant which is dissolved in the carrier medium." It is well known in the chemical arts that when something is "dissolved," no particulate form remains in the solution. Because the claimed colorant is a dye, it must be capable of being dissolved in the carrier medium of the ink jet ink. The carrier medium provided by the claimed invention is water, and optionally water-miscible organic solvents such as alcohols, ketones, ethers, etc., as listed in the specification at page 9, line 22, - page 10, line 7. By definition of the term "dissolved," the hyperbranched polymeric dye must be water-soluble, as set forth in the specification, and as would be apparent to one of ordinary skill in the art of chemistry. The specific examples of suitable hyperbranched polymers useful in forming the hyperbranched polymeric dye listed in the specification at least at page 4, lines 14-19, and page 7, lines 13-16,

are water-soluble polymers. The lack of particle formation upon forming the claimed ink jet ink using a hyperbranched polymeric dye of the invention was confirmed in the Declaration of co-inventor Huijuan Chen submitted April 16, 2004.

The terms "water-soluble" and "hydrophilic" are well known in the chemical arts to have established meanings, and the use of such terms in the claims is supported by the specification as filed, either explicitly, inherently, or implicitly, and would be understood by one of ordinary skill in the art of chemistry to be necessary requirements for the hyperbranched polymeric dye. For at least the above reasons, it is respectfully requested that the rejection under 35 U.S.C. §112, first paragraph, be reversed.

### **Summary**

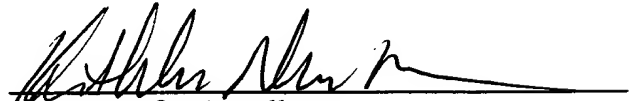
Claims 11-13 are respectfully urged to be in proper dependant form. The claims clearly require the claimed hyperbranched polymer to have a hydrophilic group incorporated into the polymer base chain. Because the claims require the product to contain a hydrophilic group incorporated into the polymer base chain, one of ordinary skill in the art upon reading the claim would understand that the monomers forming the polymer must contain the hydrophilic group. Therefore, it is respectfully requested that this objection be reversed.

The terms "water-soluble" and "hydrophilic" are well known in the chemical art to have established meanings. The presence of hydrophilic groups in the polymeric base chain is indicated within the specification, both expressly through the exemplary structures and exemplified inventive dyes, and implicitly and/or inherently as necessary for formation of a water-soluble substance, and would be recognized by one of ordinary skill in the art of chemistry as disclosed in the specification. Therefore, it is respectfully requested that the rejection under 35 U.S.C. § 112 be reversed.

**Conclusion**

For the above reasons, Appellants respectfully request that the Board of Patent Appeals and Interferences reverse the objected to and rejection by the Examiner and mandate the allowance of Claims 1 and 10-18.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Kathleen Neuner Manne', is written over a horizontal line.

Attorney for Appellants

Registration No. 40,101

Kathleen Neuner Manne/KJW

Telephone: 585-722-9225

Facsimile: 585-477-1148

Enclosures

If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.

## **Appendix I - Claims on Appeal**

1. An ink jet ink composition comprising water, a humectant, and a water-soluble hyperbranched polymeric dye comprising a hyperbranched polymer having a dye chromophore and a hydrophilic group incorporated into the polymer base chain.

10. The composition of Claim 1 wherein said hyperbranched polymer having a dye chromophore and a hydrophilic group incorporated into the base chain thereof is a polyamide, polyester, polyether, vinylic polymer, polyimine, polyesteramide or polyurethane.

11. The composition of Claim 1 wherein said hyperbranched polymer having a dye chromophore and a hydrophilic group incorporated into the polymer base chain is prepared by a chain polymerization of a monomer of the formula  $M^1-R^7-M^2_m$  wherein  $R^7$  is a linear or branched alkyl, carbonyl, or aromatic moiety containing a dye chromophore;  $M^1$  and  $M^2$  are reactive groups that react independently of each other in which  $M^1$  is a polymerization group and  $M^2$  is a precursor of a moiety  $M^{2*}$  which initiates the polymerization of  $M^1$  as a result of being activated; and  $m$  is an integer of at least 1.

12. The composition of Claim 1 wherein said hyperbranched polymer having a dye chromophore and a hydrophilic group incorporated into the polymer base chain is prepared by a condensation or addition polymerization of a

monomer of the formula  $M^3-R^7-M^4_p$  wherein  $R^7$  is a linear or branched alkyl, carbonyl, or aromatic moiety containing a dye chromophore;  $M^3$  and  $M^4$  are groups that undergo a condensation or addition reaction; and  $p$  is an integer of at least 2.

13. The composition of Claim 1 wherein said hyperbranched polymer having a dye chromophore and a hydrophilic group incorporated into the polymer base chain is prepared by a condensation or addition polymerization of a monomer of the formula  $R^8-M^5_q$  and  $R^9-M^6_t$  wherein  $R^8$  and  $R^9$  are each independently a linear or branched alkyl or aromatic moiety, at least one of which contains a dye chromophore  $M^5$  and  $M^6$  are groups that undergo a condensation or addition reaction;  $q$  is an integer of at least 2; and  $t$  an integer of at least 3.

14. The composition of Claim 1 wherein said dye chromophore is a mono- or poly-azo dye, basic dye, phthalocyanine dye, methine or polymethine dye, merocyanine dye, azamethine dye, quinophthalone dye, thiazine dye, oxazine dye, anthraquinone or metal-complex dye.

15. The composition of Claim 14 wherein said mono- or poly-azo dye is a pyrazoleazoindole.

16. The composition of Claim 14 wherein said metal-complex dye is a transition metal complex of an 8-heterocyclazo-5-hydroxyquinoline.

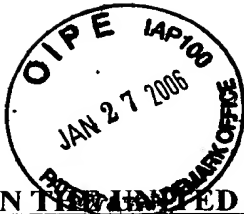
17. The composition of Claim 1 wherein said humectant is diethylene glycol, glycerol or diethylene glycol monobutylether.

18. The composition of Claim 1 wherein said hyperbranched polymeric dye comprises about 0.2 to about 20 % by weight of said ink jet ink composition.

## **Appendix II - Evidence**

Exhibit 1: Declaration of co-inventor Huijuan Chen, previously submitted April 16, 2004 and attached for convenience.

(Attachment: declaration)



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*Robin G. DePoint*

Robin G. DePoint

*April 16, 2004*

Date

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

**DECLARATION UNDER RULE 132**

I, Huijuan Chen, declare that:

I received the degree of Ph.D from the University of Rochester.

I have been employed as a research scientist with Eastman Kodak Company for over five years;

I am a coinventor in the above-captioned patent application; and

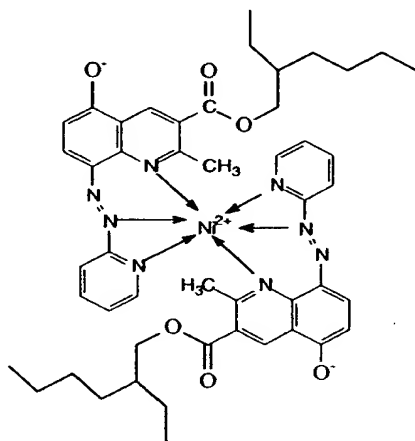
I am familiar with the Office Action dated December 17, 2003, and the Advisory Action dated March 29, 2004, and the references cited therein. The following examples are provided as support for Applicants' assertion that the ink jet ink of the claimed invention, which includes a hyperbranched polymer, provides unexpected improvements in jettability over an ink jet ink including a particulate pigment.

The following comparative ink jet ink was prepared with a formulation identical to that of the inventive Examples in the application, except the hyperbranched polymer



was replaced with polymer-dye particles. The experiment was carried out on September 14, 2001, under my supervision, as follows.

Dye-3 was used to prepare the comparative polymer-dye particle dispersion. Dye 3 is a derivative of Dye-1 used to make the hyperbranched polymeric dye HBPD-1 in the application. The structure of Dye 3 is shown below.



#### Preparation of Polymer-dye Particle Dispersion

To a 400 ml beaker, 1 g of Dye-3 was added, as well as 2.4 g of styrene, 2.4 g of butyl methacrylate, 1.2 g of divinyl benzene, and 2.0 g of ethyl acetate. After the addition, the mixture was well stirred to form an organic phase. In another beaker, 50 g of deionized water, 0.6 g of sodium dodecyl sulfonate surfactant, and 1.8 g of hexadecane were added and well stirred to form an aqueous phase. The organic phase and the aqueous phase were combined and agitated violently by either sonification or a microfluidizer for more than 20 minutes. The organic-aqueous mixture was added to a reactor comprising a round bottle flask equipped with a nitrogen inlet and a condenser to keep the reaction under inert atmosphere and avoid evaporation of the reaction mixture. 0.09 g of initiator azobisisobutyronitrile (AIBN) in 1 gram of toluene was then added to the reactor. The reaction was allowed to continue while the reactor was kept at a temperature of 70°C for four hours before being cooled to room temperature. The organic solvent was removed under reduced pressure. The polymer-dye particle dispersion prepared was filtered through glass fibers to remove any coagulum. The particles made contained about 50% by weight of a colorant phase and about 50% by

weight of a polymer phase. The particle size was 87 nanometers as measured by a Microtrac Ultra Fine Particle Analyzer by Leeds and Northrup at a 50% median value.

#### Comparative Example (Ink containing polymer-dye particles)

To prepare a comparative ink jet ink, 0.55 g of the above polymer-dye particle dispersion (10% active), 0.05 g Surfynol® 465 (Air Products Inc.), 0.6 g glycerol, 0.1 g triethanolamine, and 1.2 g diethylene glycol were added to 7.49 g distilled water. The final ink contained 0.55% dye (in the form of polymer-dye particles), 0.50% Surfynol® 465, 6.0% glycerol and 2.0% diethylene glycol. The solution was filtered through a 3 µm polytetrafluoroethylene filter and filled into an empty Hewlett-Packard HP520 ink jet cartridge. The mean particle size was 82 nanometers as measured by a Microtrac Ultra Fine Particle Analyzer (Leeds and Northrup) at a 50% median value.

#### Evidence to show no particles formation in the inventive examples

SEC (Size Exclusion Chromatography) was performed on HBPD-1, HBPD-2, HBPD-3, and HBPD-4, which are described in applicants' specification at pages 11 and 12. Polyethylene oxide (PEO) was used as a standard for calibration in water. The absolute weight average molecular weights of HBPD-1, HBPD-2, HBPD-3, and HBPD-4 were 3500, 2500, 3000, and 2700, respectively. These molecular weights correspond to a single macromolecular structure of the respective hyperbranched polymer with less than 30 repeating units, indicating no particulate formation. Inks I-1 to I-4 were made with HBPD-1, HBPD-2, HBPD-3, and HBPD-4, respectively, as described in Applicants' specification at pages 13 and 14, and showed no measurable particle sizes when measured by a Microtrac Ultra Fine Particle Analyzer (Leeds and Northrup).

#### Firability Test

A printing test was done as described in the application at page 14, lines 7-15, with commercially available Epson Premium Glossy Paper, Cat. No SO41286. The above comparative ink was loaded into a Hewlett-Packard HP DeskJet® 520 ink jet printer, and test images consisting of a series of 21 variable density patches,

approximately 15 by 13 mm in size, ranging from 5% dot coverage to 100% dot coverage, were printed onto the Epson Premium Glossy Paper. The elements were allowed to dry for 24 hours at ambient temperature and humidity. The firability was judged based on the quality of the prints using the following ratings:

A: Best - no visual image defects

B: OK - slight image defects (banding, missing lines, etc)

C: Poor - very obvious defects (banding, missing lines, etc)

D: Worst - barely printable, a lot of defects

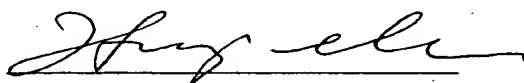
The image generated using the Comparative Example was visually examined against the printed image containing Ink-1 of the invention printed on Epson Premium Glossy Paper. The results are summarized in Table III. Mean Particle Size was determined by a Microtrac Ultra Fine Particle Analyzer by Leeds and Northrup.

Ink	Mean Particle Size (nm)	Firability Rating
C-3	82	D
I-1	Not detectable	A

The above example demonstrates the unexpected improvement in jettability of the claimed invention over inks containing polymer-dye particles.

The undersigned declares further that all statements made herein of the undersigned's own knowledge are true and all statements made on information and belief are believed to be true. These statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: 4/16/2004



Huijuan Chen

### **Appendix III – Related Proceedings**

None.